

CLAIMS:

1. An automatic transmission comprising:
 - a planetary gear unit coupled a transmission mechanism, wherein a drive train pathway of the automatic transmission includes the transmission mechanism and the planetary gear unit; and
 - a plurality of engagement elements that engage to couple planetary gear elements of the planetary gear unit, wherein the plurality of engagement elements are selectively engaged to provide each of a set of selectable gears, wherein the set of selectable gears includes:
 - a low-speed forward gear,
 - a high-speed forward gear, and
 - a reverse gear.
2. The automatic transmission of claim 1, wherein the transmission mechanism is a continuously variable transmission mechanism.
3. The automatic transmission of claim 1, further comprising:
 - a transmission casing;
 - a first damper in the drive train pathway; and
 - a second damper coupled to an engagement element of the set of engagement elements that couples interspaces between rotatory elements of the planetary gear elements and the transmission casing.
4. The automatic transmission of claim 1, further comprising an input shaft,
wherein the planetary gear unit is a single pinion planetary gear unit including a sun gear, a pinion carrier, and a ring gear as rotatory elements,
wherein the sun gear is coupled to the input shaft.

5. The automatic transmission of claim 4, further comprising:
 - a transmission casing; and
 - an output shaft,
wherein the plurality of engagement elements includes a reverse brake, a forward clutch, a low brake and a high/forward clutch,
wherein the pinion carrier may be selectively coupled to the transmission casing by engaging the reverse brake, and may be selectively coupled to the output shaft by engaging the forward clutch,
wherein the ring gear may be selectively coupled to the transmission casing by engaging the low brake, and may be selectively coupled to the output shaft by engaging the high/reverse clutch.
6. The automatic transmission of claim 5,
wherein the low-speed forward gear is selected by engaging both the low brake and the forward clutch,
wherein the high-speed forward gear is selected by engaging both the high/reverse clutch and the forward clutch, and
wherein the reverse gear is selected by engaging both the high/reverse clutch and the reverse brake.
7. The automatic transmission of claim 5,
wherein the single pinion planetary gear unit and the reverse brake are positioned on a first common axis,
wherein the low brake, the high/reverse clutch, and the forward clutch are positioned on a second common axis adjacent to the first common axis.
8. The automatic transmission of claim 7, wherein the second common axis is parallel to the first common axis.
9. The automatic transmission of claim 5, wherein the reverse brake includes a band-braking system.

10. The automatic transmission of claim 1, further comprising an output shaft, wherein the planetary gear unit is a single pinion planetary gear unit including a sun gear, a pinion carrier, and a ring gear as rotatory elements, wherein the ring gear is coupled to the output shaft.
11. The automatic transmission of claim 10, further comprising a transmission casing, wherein the plurality of engagement elements includes a reverse brake, a high/reverse clutch, a low brake and a forward clutch, wherein the sun gear may be selectively coupled to the transmission casing by engaging the low brake, and may be selectively coupled to the output shaft by engaging the high/reverse clutch, wherein the pinion carrier may be selectively coupled to the transmission casing by engaging the reverse brake, and at may be selectively coupled to the output shaft by engaging the forward clutch.
12. The automatic transmission of claim 11, wherein the low-speed forward gear is selected by engaging both the low brake and the forward clutch, wherein the high-speed forward gear is selected by engaging both the high/reverse clutch and the forward clutch, and wherein the reverse gear is selected by engaging both the high/reverse clutch and the reverse brake.
13. The automatic transmission of claim 10, further comprising:
 - a transmission casing; and
 - an input shaft,wherein the plurality of engagement elements includes a high brake, a low/reverse clutch, a reverse brake and a forward clutch, wherein the sun gear may be selectively coupled to the transmission casing by engaging the high brake, and may be selectively coupled to the input shaft by engaging the low/reverse clutch, wherein the pinion carrier may be selectively coupled to the transmission casing by engaging the reverse brake, and may be selectively coupled to the input shaft by engaging the forward clutch.

14. The automatic transmission of claim 13,
wherein the low-speed forward gear is selected by engaging both the low/reverse clutch and the forward clutch,
wherein the high-speed forward gear is selected by engaging both the high brake and the forward clutch, and
wherein the reverse gear is selected by engaging both the low/reverse clutch and the reverse brake.

15. The automatic transmission of claim 1, further comprising:
a transmission casing;
an input shaft; and
an output shaft,
wherein the planetary gear unit is a double pinion planetary gear unit including a sun gear, a pinion carrier, and a ring gear as rotatory elements,
wherein the sun gear is coupled to the input shaft,
wherein the plurality of engagement elements includes a low brake, a high/reverse clutch, a reverse brake and a forward clutch,
wherein the pinion carrier may be selectively coupled to the transmission casing by engaging the reverse brake, and may be selectively coupled to the output shaft by engaging the forward clutch,
wherein the ring gear may be selectively coupled to the transmission casing by engaging the low brake, and may be selectively coupled to the output shaft by engaging the high/reverse clutch,
wherein the low-speed forward gear is selected by engaging both the low brake and the forward clutch,
wherein the high-speed forward gear is selected by engaging both the high/reverse clutch and the forward clutch, and
wherein the reverse gear is selected by engaging both the high/reverse clutch and the reverse brake.

16. The automatic transmission of claim 15,
wherein the double pinion planetary gear unit and the reverse brake are positioned
on a first common axis,
wherein the low brake, the high/reverse clutch, and the forward clutch are
positioned on a second common axis adjacent to the first common axis.
17. The automatic transmission of claim 16, wherein wherein the reverse brake
includes a band-braking system.
18. The automatic transmission of claim 15, further comprising a set of pinion shafts to
axially support a corresponding set of pinion gears
wherein the pinion carrier is a first pinion carrier, further comprising a second
pinion carrier,
wherein the first pinion carrier and the second pinion carrier support support
opposite ends of the set of pinion shafts.

19. The automatic transmission of claim 1, further comprising:
 - a transmission casing;
 - an input shaft; and
 - an output shaft,
wherein the planetary gear unit includes:
 - a front sun gear,
 - a rear sun gear,
 - a common pinion carrier which supports a short pinion and a long pinion,
and
 - a Ravigneaux planetary gear unit with a rear ring gear as a rotatory element,
 - wherein the rear ring gear is coupled to the output shaft,
wherein the plurality of frictional engagement elements includes a first clutch, a second clutch, and a third brake,
wherein the front sun gear may be selectively coupled to the input shaft by engaging the second clutch,
wherein the rear sun gear may be selectively coupled to the input shaft by engaging the first clutch,
wherein the common pinion carrier may be selectively coupled to the transmission casing by engaging the third brake,
wherein the low-speed forward gear is selected by engaging both the first clutch and the third brake,
wherein the high-speed forward gear is selected by engaging both the first clutch and the second clutch, and
wherein the reverse gear is selected by engaging both the second clutch and the third brake.

20. The automatic transmission of claim 1, further comprising:
 - a transmission casing;
 - an input shaft; and
 - an output shaft,
wherein the planetary gear unit includes:
 - a front sun gear,
 - a rear sun gear,
 - a common pinion carrier which supports a short pinion and a long pinion,
 - a Ravigneaux planetary gear unit with a rear ring gear as a rotatory element,
 - wherein the rear sun gear is coupled to the input shaft,
 - wherein the common pinion carrier is coupled to output shaft,
 - wherein the plurality of frictional engagement elements includes a first brake, a second brake, and a first clutch,
 - wherein the front sun gear may be selectively coupled to the input shaft by engaging the first clutch, and may be selectively coupled to the transmission casing by engaging the first brake,
 - wherein the rear ring gear may be selectively coupled to the transmission casing by engaging the second brake;
 - wherein the low-speed forward gear is selected by engaging the first brake,
 - wherein the high-speed forward gear is selected by engaging the first clutch, and wherein the reverse gear is selected by engaging the second brake.